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Standard American Electric Cars



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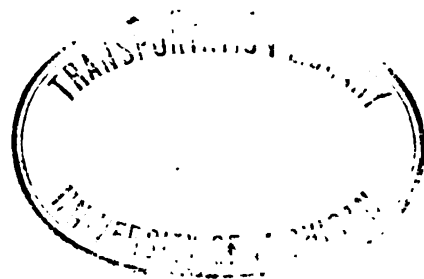
PHILADELPHIA, U. S. A.

CABLES, "BRILL, PHILADELPHIA"

THIRD EDITION, JUNE, 1899

17 VICTORIA ST., LONDON, S.W.
ENGLAND

TELEGRAMS, "AXLES, LONDON"



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St. Reps - General

Standard American Electric Cars



J. G. BRILL COMPANY

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TELEGRAMS, "AXLES, LONDON"

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Philadelphia, U. S. A., and
71 Victoria St., London, England

Introduction

The introduction of power and the abandonment of animal propulsion on railways has modified to a considerable extent the types of cars heretofore used.

An attempt has been made in the following pages to show the leading types of standard American cars, and to indicate the lines of service to which they are adapted. The cars in use of the classes illustrated outnumber very largely all others in the United States.

These styles meet all the requirements of city and suburban and interurban service in this country, and with

slight modifications can be made suitable for any other conditions.

In addition to furnishing cars complete and boxed for foreign shipment, or "knocked down," we have, after some years of study and experiment, devised and perfected a system of constructing street cars for export, which enables us to offer cars with trucks at low prices.

We build the car complete in such a way that it can be taken apart and the sections very compactly boxed. The cars are shipped "in the white," that is, they have a foundation coat of white lead priming, properly applied, but are not painted or varnished. All wood surfaces are properly pro-

Fig. 201
Sheet 1
5-2-29

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ected by this foundation coat. The metal work has a coat of red lead. The inside woodwork is filled, and has one coat of shellac, or oil, as may be desired. There is no upholstery nor glass furnished, but the car is otherwise complete mechanically.

To the uninitiated we may explain that this method differs materially from what is called the "knock-down" system of building cars. The latter necessitates the doubling of all parts coming together in reuniting, and thus gives a considerable useless and clumsy bulk.

The import duties upon cars "in the white" are always much less than upon finished cars, and this item alone effects a considerable saving. There being no paint or varnish to be injured, the packing of the sections can be very close and economical, and the cost of ocean transportation correspondingly reduced. The dangers of shipment in this way are greatly reduced.

Our cars are so designed that, although they pack in the smallest space, they are, when re-erected, as strong and durable as those which are shipped whole.

The sections are carefully planned so as to make the work of erection easy and mistakes nearly impossible. It is found that skilled labor is not necessary for erection. The work can be well done by ordinary mechanics.

Materials and Specifications

For long sills we use the best untapped Georgia long-leaved yellow pine. This is a stiff, strong wood, which holds iron perfectly. It is the king of woods for long, large timbers. Oak is used for all sills where it can be obtained of sufficient length. All end sills and crossings are of oak, its elasticity, toughness and durability being especially valuable. When properly seasoned it never decays. The posts are invariably of "second growth" white ash; this is the lightest and toughest wood that we can find for the purpose. It is highly appreciated abroad and is extensively exported. The panels are always of white wood (*Iriodendron*). The white wood holds glue firmly, and, as it is light and strong and can be obtained in any lengths, is highly esteemed. Georgia yellow pine is used for belts and plates as well as for the upper rails; ash is also employed for these parts and for the carlines. The pine can be obtained in any desired lengths, and is therefore especially valuable for long bodies where it is desired to avoid splicing. Ribs and the smaller members of the framing are usually of ash, on account of its elasticity. In all cases light and strong timber is preferred to that which is simply heavy. In all

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large or long cars the important sills are reinforced with iron. Where heavy strains come upon the framing or sills, malleable angles are inserted. In heavy cars the crossings are all plated. All corner joints on the exterior are protected by metal bands, strips and specially stamped plates set in waterproof cement. Roofs are invariably of narrow matched white wood and covered with cotton duck laid in white lead.

Dimensions of timbers cannot be given, as they depend upon weight of car, service to which it is put, style, etc. Our standard designs provide an ample margin of safety. We have three standard styles of finish. The No. 1 finish calls for mahogany doors, sash, linings and blinds (or curtains), mouldings and panels; gold and white raised figures on the three-ply veneer head linings. Cushions plush-covered and filled with hair; windows polished plate glass. At an additional expense, carvings, relief designs and silk curtains are added. Exterior decorations and lettering in gold leaf. All metal trimmings of solid bronze.

The No. 2 finish is that generally used in America. The wood of the interior is cherry wood, natural color or stained to the tint of mahogany. The roof is of three-ply veneer. The

seats are of cherry strips, covered with wilton carpet. Spring seats, covered with woven rattan, are often used instead. The windows have double-thick glass and are fitted with curtains or blinds. Decorations in aluminum, with a little gold; all metal trimmings of solid bronze. The cheapest, or No. 3 finish, substitutes ash for the cherry, leaves out the head lining and finishes the roof with carlines showing. It substitutes ash and cherry slat seats and backs with seats only covered with velvet carpet, and uses malleable iron painted trimmings in place of solid bronze.

The same standard of quality of materials, style of construction and workmanship are employed, be the finish No. 1, No. 2 or No. 3, the distinction applying merely to the decorations and not to the structure of the car.

The weights given are for cars and trucks complete without motors.

The width of any of the cars which are described can be made to suit purchasers. Usually this dimension is governed by municipal regulations, the width of the gauge, or space available in the street. The height over all can also be made to conform to any desired limit.

Weights and Measures

Throughout this pamphlet we have given weights, dimensions and distances in the measures, weights, etc., of the United States. These are the same as those of Great Britain, with one exception, the gallon, which is 20 per cent. smaller than the English Imperial gallon.

The following figures may be taken for approximate calculations in reducing the figures to those of the metric system:

| | | |
|-----------------|---------------------|------------------------|
| 1 foot is . . . | '305 meter, | more accurately, '3048 |
| 1 inch is . . . | 25 millimeters, " " | 25 $\frac{1}{8}$ |
| 1 mile is . . . | 1'6 kilometers, " " | 1.61 |
| 1 gallon is . . | 3'8 liters, " " | 3'785 |
| 1 pound is . . | '45 kilogram, " " | '4536 |

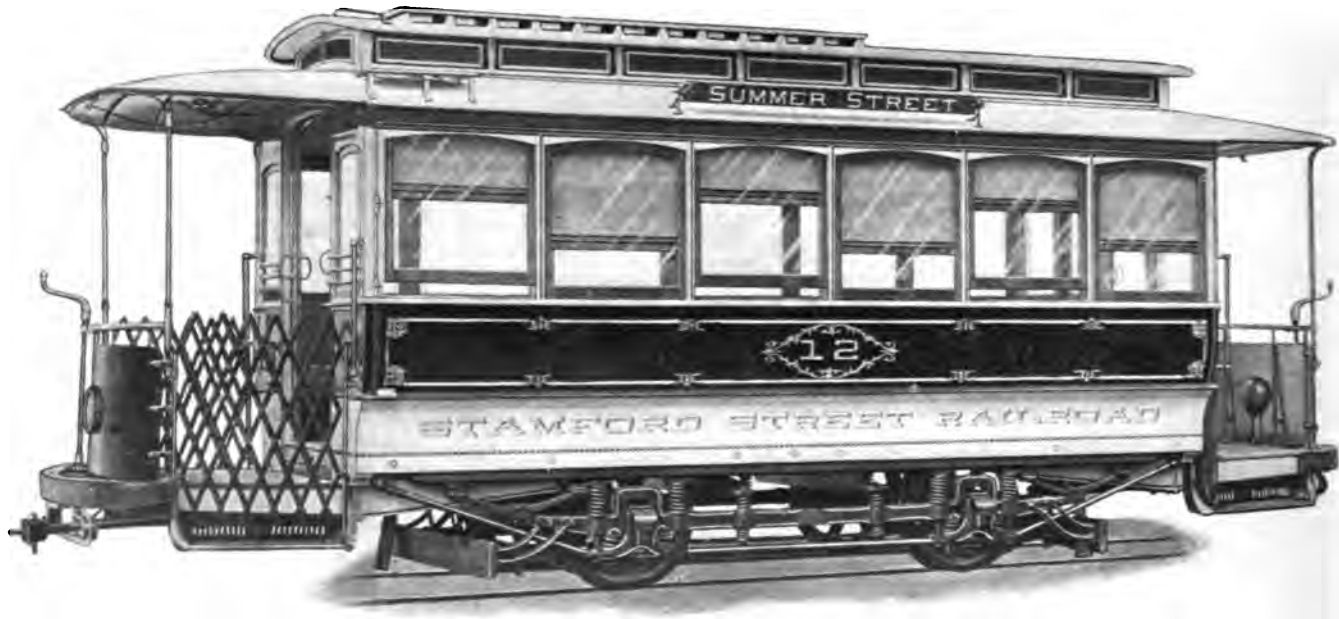
The weights and dimensions given are those of our standard cars. While these are generally used, they can in most cases be varied to suit purchasers.

Lengths of body are, in most cases, given over the corner posts of open cars and over end panels of closed cars. The whole length of the car is taken over the bottom of dashers. As the buffers usually project 10 inches each, the "length over all" is in every case 1 foot 8 inches greater than the length over the dashers. This projection can be varied to meet special requirements of purchasers. In no case does the "length over all," as we give it, include the projection of the draw-bar.

The height is usually measured from the head of the rail to top of the trolley board, if there is one, otherwise, over the crown of the roof. This dimension is capable of variation to meet existing conditions.

We make open cars for double-track roads, or, where it is necessary to prevent entrance and exit from one side, with folding steps and entrance guards. Entrance and exit cannot take place on the side next the opposite track or on the dangerous side. This is a means for preventing accidents.

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STANDARD EIGHTEEN-FOOT CLOSED OR BOX CAR.
Mounted on Brill No. 21-E Truck.

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Eighteen-Foot Closed or Box Car—Standard

This type of car is more popular and more generally used in the United States than any other. The car consists of a closed body, 18 feet in length, with two platforms, one at each end; length over all, 26 feet. Side seats extend the full length of the body, and afford room for twenty-four persons comfortably. The windows are fitted with sash to raise, an innovation by a steam railway man; our customary practice, however, is drop sash. Blinds can be substituted for curtains if they are desired. The roof has a monitor, or raised deck, with movable deck lights. This not only furnishes ample ventilation, but adds to the cheerfulness and lightness of the car. The sides of the car are curved so as to obtain strength and at the same time diminish the width at the sills—an important matter in narrow streets.

The width of the body at sills for a gauge of 4 feet 8½ inches is 6 feet 2 inches, and at the belt rail 7 feet 6 inches. This width, however, is largely determined by the character of the street traffic and the actual distance available between the

rails on curves. It may be varied within wide limits. In foreign countries the width is usually determined by municipal regulation. This type of car is adapted to a great variety of conditions and to nearly all kinds of traffic. It affords perfect protection to passengers in the most inclement weather, and, in cold climates, admits of being made comfortable in the severest cold.

Smaller cars are not as profitable, the fixed charges being distributed among a much smaller number of passengers.

Portable or fixed vestibules may be applied to these cars, and are usually required in cold climates and where violent storms are common.

The construction of these cars is of a very solid and durable character, and if they are kept properly protected with varnish and paint, so that water does not find access to the joints of the wood, and if bolts and nuts are kept tight, their life appears to be almost unlimited. We make this type of car in 14, 16, 18 and 20-foot lengths, or as much longer as is required.

Weight of 18-foot car and truck without motors, 10,400 pounds.

The car illustrated is mounted on Brill No. 21-E Truck.

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DOUBLE-DECK CAR—STANDARD DOUBLE-DECK TYPE

Mounted on Brill No. 21-E Truck.

J. G. BRILL COMPANY

Philadelphia, U. S. A., and

71 Victoria St., London, England

Standard Type Double-Deck Car

Although double-deck cars are not extensively used in the United States, they have been used in some cities for many years, and the style shown has become a well-organized type. These cars have been built in large numbers for use abroad, where they are very popular. The character of the American climate, no doubt, has much to do with their limited use. Extremes of weather make seats without protection very undesirable here. Rational rules for stopping for people who wish to alight from the upper deck have rarely been adopted, and hence the car has been pronounced slow. They are, however, very much liked by the people as summer cars, in spite of the lack of protection against storm.

The car illustrated is one which was built especially for the Fisheries Exhibition in London. It is nearly the same, in most respects, as those built by this company for the Hull Corporation Tramways and Dover Corporation Tramways of England, Port Elizabeth and Cape Town Railways, in South Africa. The following is an outline of the specifications: Length of body, 16 feet; width over all, 7 feet; width at sills, 6 feet 1 inch; width at belt rail, 6 feet 5 inches. The car seats 22 persons inside and 25 upon the upper deck, which has 12 slat seats spaced 2 feet 6 inches between centres. The backs are what is known as the "walkover," or garden type, swinging over the seat without reversing. They are very much liked on account of their simplicity and durability. The inside seats

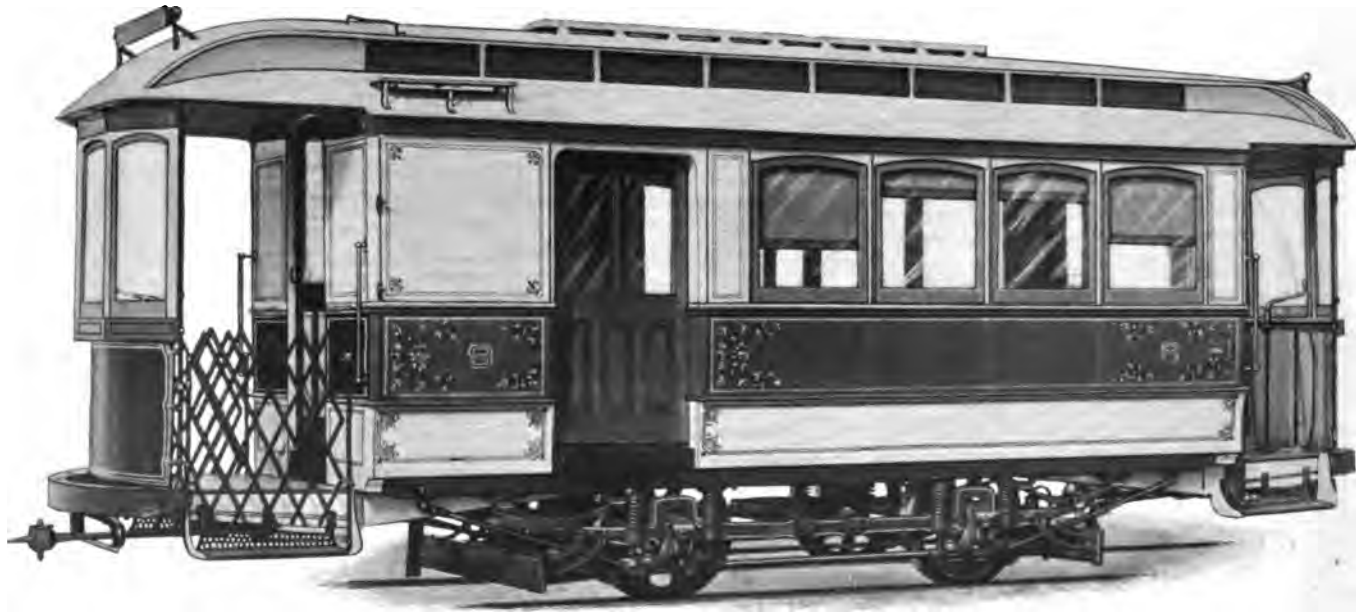
are longitudinal, and are upholstered in plush. Two platforms, one at each end of the car, are provided, with circular stairways for reaching the upper deck. The motorman is placed in front of these, where he has ample space for handling both the brake and the controller. The inside finish can be of any style desired. In the car sent to Port Elizabeth a canopy was placed over the upper deck, protecting the passengers from both sun and rain. The height of the canopy from the head of the rail is 15 feet 9 inches.

There are five windows upon a side, and a radical departure from ordinary street car practice has been made in them. Instead of dropping below the window rail behind the seat back, they are arranged to rise 3½ inches, as in parlor and sleeping cars. This is found ample for ventilation. A greater lift is likely to produce unpleasant drafts when the car is moving at a high rate of speed. The cars can be built with the windows to lower when it is so desired.

A new form of spring roller curtain is used instead of blinds. These curtains retain their position without locks or spring catches. The curtains are much lighter than blinds, and are more easily manipulated. Double-action doors, opening from the centre, are fitted at each end of the car. Bronze, highly polished and lacquered, is used for trimmings and hardware throughout. Weight of car and truck complete, 12,946 pounds.

The car illustrated is mounted on Brill No. 21-E Truck.

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EXPRESS, BAGGAGE AND PASSENGER CAR COMBINED.
Mounted on Brill No. 21-E Truck.

J. G. BRILL COMPANY

Philadelphia, U. S. A., and

71 Victoria St., London, England

Baggage and Passenger Car Combined

Suburban and interurban services are of such a nature as to make an express and freight service almost imperative. This is especially true on suburban roads where long distances are covered.

The carriage of freight under such conditions and the transaction of express business has been found to be very profitable in the United States, and cars entirely or partly devoted to this work are extensively used. In many cities these cars are also used for the transportation of mail bags or pouches to and from central post offices.

The illustration upon the opposite page shows a car designed for both freight and passenger service. This combination meets with the greatest favor, because such a car can take a regular place in the schedule and do the work of a passenger car without interruption of the service, while at the same time it has ample capacity for baggage and express matter or freight.

For interurban traffic, where this particular form of busi-

ness becomes very heavy, large cars without passenger accommodations are frequently constructed; they may be mounted on double trucks if necessary.

The car illustrated has a seating space for fourteen persons. The seats are longitudinal and the passenger compartment is fitted up in the usual style. The baggage room occupies one-third the length of the body. It has two 4-foot sliding doors, one on each side. A swinging door is placed in the partition which separates the two compartments. The finish of the baggage room is so arranged that it is not injured by the rough usage which it receives.

With the exception of the sliding doors upon the sides, these cars are externally finished like closed standard motor cars. In this particular case a portable vestibule is shown and platform closed by folding gates. The sash are arranged to drop in the usual manner.

Length over dasher, 28 feet; width at belt, 7 feet 6 inches; length of baggage compartment, 8 feet; length of passenger compartment, 12 feet, giving the body a length of 20 feet. Platforms, 4 feet wide. Weight of car and truck complete, 13,550 pounds.

The car illustrated is mounted on Brill No. 21-E Truck.

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COMBINATION CAR—"CALIFORNIA" TYPE.

Improved Form, Giving Low Platform Steps. Mounted on Brill No. 21-E Truck.

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Combination Car California Type

This peculiar form of car originated on the Pacific Coast of the United States, and was the direct result of a modification of existing types to suit the requirements of the mild climate. Its success has been great. It is almost universally used on the Pacific Slope. Its advantages are causing its use to increase in all parts of the country where it has been tried. With the modifications which we have introduced, bringing the steps down as low as those of an ordinary street car, it seems likely to become the summer car of the future. Briefly described, the car consists first, of a short closed body, seating eighteen persons. This portion differs in no way from an ordinary standard box car of the same capacity. Second, there are two open platforms with a seating capacity for twenty persons and a large amount of standing room. There are two seats, back to back, with a bulkhead framed between them, the latter fitted with both sash and blinds. This portion of the car, though covered by the roof and hood, is entirely open. It has folding steps like an open car, and is fitted with side curtains of the spring roller pattern, the edges of which run in grooves in the posts. In case of sudden storms or rain, by raising the sash in the bulkhead and lowering the curtains, which come all the way to the floor, the pas-

sengers are entirely and almost instantly protected from the weather.

On these cars passengers always have the advantage of securing outside seats without climbing stairs, and can alight from the open seats without coming down a long stairway.

By the former method of construction the sills ran straight from end to end of the car, and of course raised the platforms very high. In our method of construction the two platforms are dropped and a pair of deep angle irons introduced under each side sill to carry them. These angle irons are offset as shown in the cut, and carry the whole weight of the platforms, thus relieving the body of the car from a great and entirely unnecessary strain.

The dimensions of the car shown in the engraving are: 13 feet 5½ inches length of body; length of platform, 7 feet 9 inches; width at belt rails, 6 feet 5 inches; width at sills, 5 feet 11 inches; length over dashers, 28 feet 11½ inches.

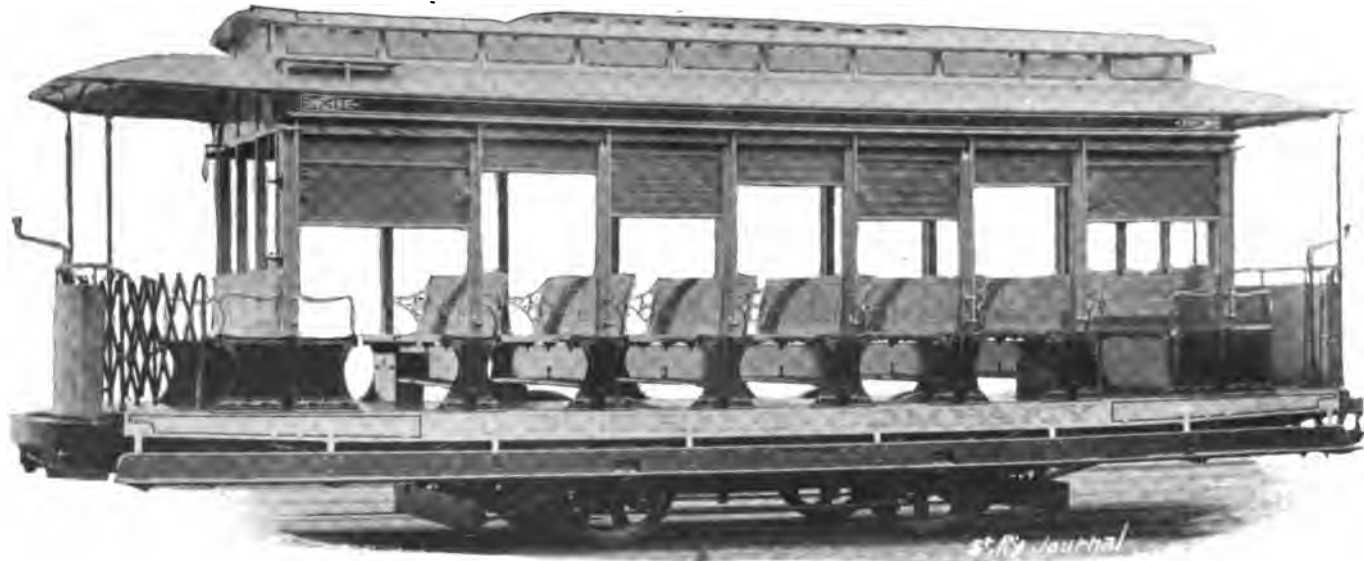
Finish of selected white ash. Ceiling, three-ply bird's-eye maple. Spring upholstered seats covered with red plush. Nine ventilating sash in roof.

Five windows on a side. Rise, 3½ inches. In these cars we have found it gives great satisfaction to have the sash rise a short distance, as much as the rapid motion makes agreeable.

Gauge, the English standard, 4 feet 8½ inches. We build to any desired gauge and width of car body.

Weight of car and truck complete, 13,219 pounds.

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TEN-BENCH OPEN CAR.
Mounted on Brill No. 21-E Truck.

J. G. BRILL COMPANY

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The Ten-Bench Open Car

For summer use the ten-bench open car has proved itself suitable for operation under the very widely varying service. This type is used in the most crowded thoroughfares, like Broadway, New York, as well as on suburban lines. The large seating capacity, fifty for ten-bench, makes it a favorite with both passengers and railway managers. The seats, with the exception of those at the bulkheads, are reversible, so that nearly all the passengers face forward, save those on two of the bulkhead seats. Curtains coming to the floor and held in place by battens, and glass sash in the bulkheads, give perfect

security from sudden storms, showers, etc. These cars are very rapidly loaded and emptied, and can therefore be run on very short headway. This is a point of much importance when crowds are to be handled at amusement parks, theatres, etc. If so desired, this type can be made without the raised deck and can be mounted on double trucks. When double trucks are used the seating capacity may be increased to any desired extent by lengthening the body and adding seats.

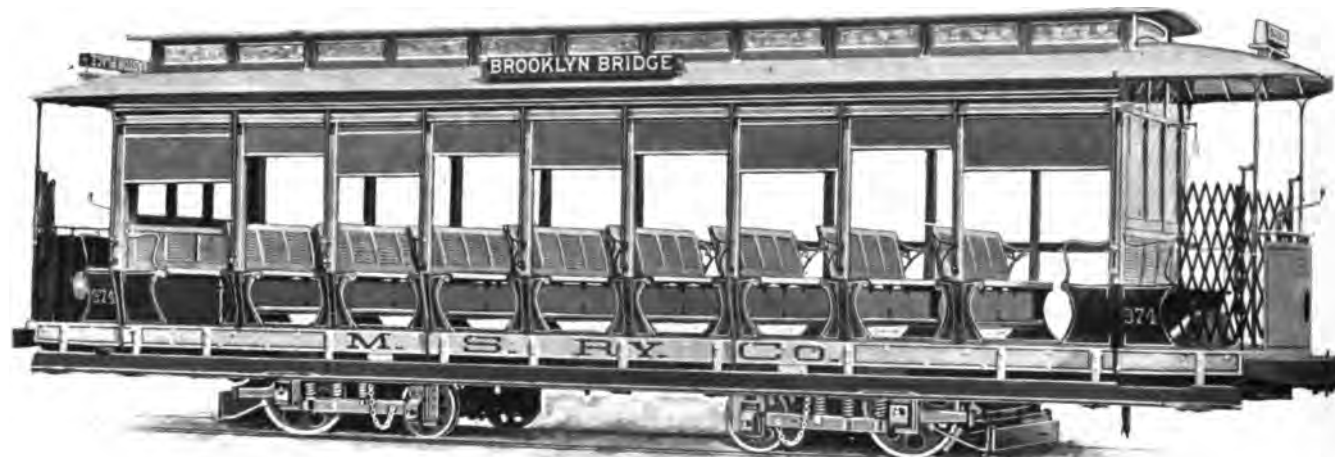
The length over dasher is 28 feet 8 inches; width at sill, 6 feet 2 inches; width at posts, 7 feet $\frac{1}{2}$ inch. Weight of car and truck, 12,000 pounds.

The car illustrated is mounted on Brill No. 21-E Truck.

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TWELVE-BENCH OPEN CAR, METROPOLITAN STREET RAILWAY, NEW YORK CITY.

Mounted on their Standard (Brill) "Eureka" Maximum-Traction Trucks.

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Twelve-Bench Open Car

On account of their popularity with passengers, their great economy of time in emptying and loading and their large seating capacity, there has been a constant demand for open cars of the largest size and greatest seating capacity. The car illustrated was designed for the Metropolitan Road of New York City with a special view to meeting this demand, and a large number of them, some 300 in all, we have built for this Company. Externally, the first striking feature is the great length, which is in our standard style, 34 feet over dashers. The car can seat sixty persons, and on account of its great length and weight is mounted on a pair of pivotal trucks. Thus mounted, there is practically no limit to the length and carrying capacity.

By using Maximum-Traction trucks the body is carried so low that the step or running board is approximately at the same height as the steps of the ordinary four-wheeled open car. As but two motors are used in this case, the expenses of operation are practically the same as for carrying a like weight upon four wheels.

The general dimensions of this car are, length over platforms, 34 feet; width at sills for standard gauge, 6 feet 5 inches; width at posts, 7 feet 2½ inches. Our standard length of platform is 4 feet. Height to the under side of the sill is 26

inches. Sills plated with iron and ends of car defended with Brill angle iron buffer. Height of car from track over trolley board, 11 feet 4 inches. Total weight, 18,280 pounds without motors. Diameter of driving wheels, 30 inches, and of pony wheel, 20 inches. The seats are fitted with our curved or round corner seat end panels, which enable the curtains to come all the way down to the floor as described on page 47. There are eight reversible and four stationary seats. The backs and seats are of ash and cherry slats. In this particular case the trimmings of the car were of solid bronze throughout.

The following dimensions are standard for this type of car. Those of the car illustrated are somewhat larger:

| | |
|--|-------------------|
| Length over dasher | 34 feet. |
| Length from dasher to centre of corner posts | 4 feet. |
| Distance between centres of rever- sible back seats | 2 feet 8 inches. |
| Width of car at seats | 7 feet 7½ inches. |
| Width at sill | 6 feet 9 inches. |
| Height from rail to crown of roof | 11 feet 4 inches. |
| Weight of car and trucks | 16,000 pounds. |
| Seating capacity | 60 persons. |

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COMBINATION CAR, METROPOLITAN STREET RAILWAY, NEW YORK CITY.

Mounted on their Standard (Brill) "Eureka" Maximum-Traction Trucks.

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Combination Car Modified "California" Style

The engraving shows a modification of the California open and closed car, which has become very popular in the East, and a large number of them have been put in service by the Metropolitan Street Railway Company, of New York.

These cars have been of special value in New York City, because the rules of the Board of Health require one car in every four to be closed, and by the use of the combination cars the regulations are complied with, and at the same time in the summer season passengers who do not wish to ride in a closed car do not have to wait.

This general type seems to be a great favorite with all classes. The protection it affords to invalids and delicate persons is ample, while smokers and those who like the open air are equally well accommodated.

The car consists of an open part having seven cross seats, five of which have reversible backs and a closed compartment 11 feet 3 inches long, with longitudinal seats.

The closed portion differs in no way from that of a short closed car of the ordinary type. Its platform is lowered and a 14-inch step with a 12-inch riser gives access to it, making it easy of entrance for women, children and elderly persons. The open part has the usual folding steps extending as far as the closed body. This portion is fitted with a guard rail, the usual curtains coming to the floor and folding gates. The car is by

preference mounted on Maximum-Traction trucks, its great length, which in this case is 37 feet 9 inches over all, being too great to be carried upon four wheels. As fitted up for the Metropolitan Road, the finish inside was of white ash, with three-ply veneer headlining. Push-buttons were placed on each post for signalling the conductor. The grab handles were of white hickory, carried in solid bronze holders. The dimensions of the car are:

| | |
|--|------------------------|
| Length over dasher | 36 feet 1 inch. |
| Length of the two bodies | 28 feet 11 1/2 inches. |
| Width at the sills | 6 feet 5 inches. |
| Width at the posts | 7 feet 2 inches. |
| The rear platform is | 3 feet 8 inches. |
| Height to the under side of sill . . . | 26 inches. |
| Height over trolley crown of roof . . | 10 feet 11 inches. |
| The wheel base of each truck is . . | 4 feet. |
| Diameter of driving wheels | 30 inches. |
| Diameter of pony wheels | 20 inches. |

Some of these cars are fitted with a pair of G.E. 1,000 motors, while others have G.E. 57 motors. The weight of the car without motors is 18,100 pounds.

These cars can be built of any desired size, and the relative lengths of the compartments varied to suit the ideas of the purchaser.

A good all-the-year-round car in any moderate climate. Can be used in a mild climate long after the ordinary closed car has been called in.

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METROPOLITAN CLOSED CAR, NEW YORK CITY.

28-foot Standard Closed Car, Metropolitan Railway, Mounted on their Standard (Brill) "Eureka" Maximum-Traction Trucks.

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Philadelphia, U. S. A., and

71 Victoria St., London, England

Twenty-eight Foot Body Closed Car

The general tendency and practice of the last few years among the large street railway companies has been in the direction of the largest street car unit that could be handled by two men. Since the first introduction of power for street car propulsion there has been a steady increase in the size of the car body. The larger car gives a greater seating capacity, and as it requires no larger crew than the other there is a distinct gain in this direction. It is also found that the cost of operation depends practically upon the number of units to be propelled rather than on their size. Where two motors are employed the cost of running the largest cars is sensibly the same as that of the smallest and lightest, while the proportion the wages of the crew bears to the number of passengers shows a material advantage in favor of the large capacity. The largest car which two men can handle has for the heaviest city traffic other material gains. The short riders are encouraged because the passenger has at all times a reasonable assurance of a seat. In European practice this is even a stronger inducement than in America, since with a large seating capacity there would rarely or never be a case where a passenger would be excluded from a car for want of room. In the rush hours there is also more standing room available without crowding.

The adoption of the large unit is growing rapidly among the larger and more important roads of the country.

But it is by no means confined to them, however; it has been found that in some cases a small road, by using a larger car, can seat nearly all of its passengers at the rush hours without any material increase of expense. This is an advantage which managers are not slow in seeing.

Among the roads which have adopted the large car is the Metropolitan Street Railway of New York City. This road is probably better known than any other in the world, and its practice is more carefully studied by street railway men than any other railway. The car which the road had adopted for its underground trolley lines is shown on the opposite page. These cars have an additional interest because they are intended for the heaviest traffic ever encountered upon a street railway.

The standard dimensions of these cars may be taken as given below: 28 feet long over the end panels. Platforms, 4 feet long over the crown piece. Total length of car over angle iron bumpers, 37 feet. Width at sills, 6 feet 6 inches. Width over body, 7 feet 6 inches. Height of steps from head of rail, 12¾ inches. Height of riser, 12 inches. Under side of sill, 26 inches from head of rail. The height over the roof is 10 feet 10 inches. In this case no trolley board was necessary, as the road uses the underground trolley. The height over the board would be about 11 feet 2 inches. Weight of car complete but without motors is 16,750 pounds. Weight of trucks, 3,200 pounds each.

These cars are all mounted on Brill "Eureka" Maximum-Traction trucks with 30-inch driving and 20-inch pony wheels.

J. G. BRILL COMPANY
Philadelphia, U. S. A., and
71 Victoria St., London, England



CLOSED CAR.
On Pivotal Swing Beam and Equalized Trucks. The "Universal" Truck, No. 27-G.

J G. BRILL COMPANY

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Long Closed Car on Double Trucks

For heavy traffic carried over long distances it has been found advantageous to use large cars of the ordinary closed type. The car shown on the opposite page is of this kind, and was built for a long suburban line, where a high speed was essential. Double trucks under such conditions are, of course, necessary.

The car as shown has a body 25 feet 6 inches long. It is 7 feet 8 inches wide over the posts, and 8 feet over all. The total length is 35 feet 2 inches. There are two open platforms, 4 feet wide, closed by gates. The sills are plated or faced with steel, $\frac{3}{8}$ inch by 5 inches, and the body is trussed. There are longitudinal spring seats with spring backs, upholstered in cane. The car will seat 34 people. For convenience in signalling the conductor there are push-buttons on each post. As ordinarily fitted, cars of this class are able to haul a trailer and are built with the usual draw-bar and patent draw-gear. The platform is protected by an angle iron buffer plate, curved to fit the ends of the platform knees, which are extended beyond the crown rail for this purpose. The trucks used are of the type known as "The Universal," Brill No. 27-G; these have long half-elliptic springs, which act as equalizers. The

spring swing links carry the ends of the half-elliptic, giving an extremely easy side motion, while journal springs on the boxes cushion all the weight except that of the wheels and axles.

Cars mounted in this way ride with extreme ease and are much liked by passengers. It has also been remarked that they make much less noise than cars mounted on four wheels. This is due to their easy action on the track and the entire absence of galloping. Even when wheels become worn and the rail joints are not perfect, no rhythmic motion of the body can be set up under any condition.

These cars thus mounted can run at any desired rate of speed, being perfectly safe at from 30 to 35 miles per hour. They may be used for interurban as well as suburban service.

Although these cars are somewhat heavier than those mounted upon four wheels, they are much less destructive to the track and are themselves much more durable. Carefully conducted experiments show that the amount of power needed is no greater than for four-wheel cars.

This class of car has recently been adopted as standard by several of the largest traction companies in the United States, and numbers of them have been purchased for interurban lines to replace four-wheel cars. Weight of car and trucks, 18,000 pounds.

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EIGHT-WHEEL CAR.

Mounted on "Perfect" Truck (Brill No. 27) for High-Speed Interurban Service.

Two Types Compared

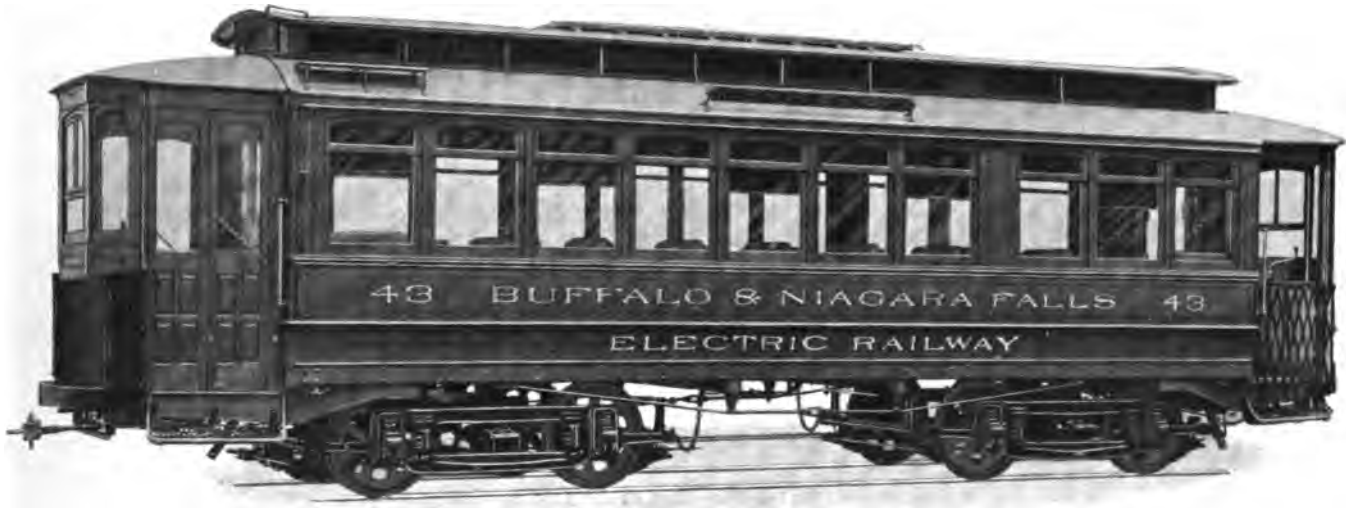
The two types shown on this and the following page differ but slightly in external appearance from each other. They are,

however, intended for entirely different kinds of service. One is especially suited to city and suburban work and can be operated with ease and safety in city streets, over tram rails. The other car is distinctly suited to interurban service and closely

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EIGHT-WHEEL CAR.

Mounted on "Perfect" Trucks (Brill No. 27) for Fast City and Suburban Service.

approaches steam car practice. It can be operated without danger at a speed as high as 50 miles per hour. It should be noted that both cars are mounted upon the same styles of

"Perfect" Trucks (the Brill No. 27), with spring swinging link equalizing bar. The differences mentioned belong, therefore, entirely to the car bodies.

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The Akron, Bedford and Cleveland Car

This car is intended strictly for interurban service. A complete steam road roof is used, which makes the hood a part of the upper deck and vestibule, a form of construction only desirable when cars are to be run in trains, or when trailers are to be hauled at high rates of speed. Only one vestibule is used, as the car in this case was intended to run in one direction only, like a locomotive engine. As it has to draw a trailer, an opening is made in the rear dasher to enable the conductor and passengers to pass from one car to the other with perfect safety.

This type of car has what is known as the "steam-car side." The posts are straight and are mortised directly into the sills, giving the car a perfectly straight side which is finished outside with narrow matched sheathing. Within the wall of the car a strong truss is introduced, of the type commonly used on steam roads. This is the full depth of the side below the window sills and of ample strength to carry the load.

The straight side gives more space at the floor of the car. Cross seats with reversible backs are used, two persons to a seat. There is the usual centre aisle. The windows are fitted with curtains. Cars of this kind have great strength and carry large loads. Being carried upon centre plates near the ends,

the strains in the framing are always in one direction, and effective forms of truss can be employed to resist them.

These cars can be run to any desired rate of speed up to 50 miles per hour and with perfect safety. The great strength of the body enables them to do their work easily and makes them very durable. They weigh about 27,860 pounds, are 31 feet 10¼ inches over the body, 40 feet 4 inches over platforms, and when built as shown have 18 transverse and 4 longitudinal seats, with a capacity for 44 persons. The transverse seats are of the "walkover" or garden type, and accommodate two persons each. This type can be built up to a seating capacity of 72.

Buffalo and Niagara Falls Car

This type is designed to meet the wants of a city and suburban line. The construction is modified so as to be suitable for crowded streets, while the double trucks enable it to make fast suburban runs in safety.

The sides of the body are doubly curved for the purpose not only of obtaining strength, but to reduce the width over the sills. The upper side panel is convex, while that below is concave, following the style of the four-wheel tram car. This gives a form of great strength and stiffness. The panels are put on in long sections, well glued and screwed to both

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frame and ribs. The backs of the panels are lined with canvas (scrim), which is also turned up on the posts, ribs and rails, and glued fast, a construction adapted from the old coach-building methods. By this system a body is obtained which is in effect one piece of timber. It is much stronger and more durable than the straight steam-coach side. The narrowing of the car at the sills is a great advantage, especially in crowded streets, at curves, etc.

The car illustrated has a 29-foot body, is 38 feet 8 inches over all, with a vestibule at both ends. These are provided with both folding doors and folding gates, the latter being used in summer. The car has sixteen cross seats of the "walk-

over " or garden pattern. There are four longitudinal or fixed seats. This enables the car to seat forty persons. The width of the car is 7 feet 5 inches over the sills and 8 feet at the belt rail. The sills are reinforced with metal plates, laid in waterproof cement. The buffer at the end of the car is so arranged that hubs of vehicles cannot injure the dash. These cars are very economical of power, as they are arranged with four motors on the car, worked in series in the city at slow speed, and in the country, where a high speed is needed, they are changed to parallel.

Weight of car and trucks, 23,750 pounds.



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HIGH-SPEED CITY AND SUBURBAN CAR—BUFFALO AND LOCKPORT RAILROAD.
Mounted on Brill No. 27 Trucks.

J. G. BRILL COMPANY

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Buffalo and Lockport Cars

A still heavier car than those of the Akron, Bedford and Cleveland and the Buffalo and Niagara Falls Roads, but of the same general type, is shown on the opposite page.

The following are the leading constructive features. They have the additional features of passenger and smoking compartments: The cars are 31 feet 8 inches long over the end panels, and, with platforms 4 feet 6 inches long, measure 40 feet 8 inches over the vestibules. The buffers are of the Brill angle iron pattern. The width of the car at the sills is 7 feet 8½ inches, and the width over all 8 feet. The sides of this car are to some extent a combination of steam and electric road practice. They are trussed upward, and have truss rods below, very much as in the ordinary steam car side. In paneling, street car practice has been adopted, with the usual longitudinal panels protected by guard and window rails. The panels are put on to ribs in the usual manner, and lined with scrim, turned up on the rails and posts. The sweep of the post is small, about 1¼ inches, but it is enough for the purpose. All the posts, which are 1½ inches, are double glued together, and have a ¾-inch rod passing down between them. These features, combined with a truss plank bolted to the sills and gained out to receive the posts, they "boxed" into each other, give a car side of great strength, and at the same time it is very light, stiff and durable. The roof is of the regular street car type, with trolley board in the centre. The height over the trolley board is 12 feet. The height to the under side of the sill is 35 inches, and in order to enable a single step to be used easily the platforms are dropped 10 inches below the floor of the car. This, with a 14½-inch riser, enables the step

to be brought within 18 inches of the ground. The platforms are enclosed by a round-end vestibule. These vestibules have openings on the diagonally opposite corners of the cars. Hinged doors, which fold back against the vestibules, completely enclose the platforms when so desired. Folding gates are also provided. These turn back against the outside of the vestibule.

The car is divided into two compartments, one of which, seating twelve persons, is used for smokers. This is 9 feet 2 inches long, and has six reversible back seats. This compartment is separated from the remainder of the car by a partition having glass windows on each side of the sliding door; in the other compartment there are fourteen reversible back seats. All the seats have spring cushions, and covered with woven cane. The aisles are fitted with grooved hardwood floor boards. The floor under the seats is left smooth.

Another type of this car has an 11-foot baggage compartment in one end, with 4-foot sliding doors upon the side of the car as well as at the end. It is furnished with plain folding seats, so that it may also be occupied as a smoking compartment. These cars are particularly interesting, as they are used on the Buffalo and Lockport Railroad, replacing the steam equipment by which the road was originally operated. They present in themselves nearly all the conveniences of the American steam train. These cars are operated over their own right of way up to a speed of fifty or more miles per hour, the motors being geared up to this speed. They are, however, quite capable of running inside of city limits upon street railway tracks, and are thus used by the railway company.

| | |
|----------------------------------|---------------|
| Weight, without motors | 28,000 pounds |
| " of each truck | 6,300 " |

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PRIVATE OR PARLOR CAR.
Mounted on "Eureka" Maximum-Traction Trucks.

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Palace or Private Cars

Upon the opening of the extensive system of electric tramways in the city of Philadelphia, a new and profitable traffic sprang up. This was the renting of cars to excursionists, or "trolley parties," as they are called. This branch of business developed so rapidly, and was so profitable as well as popular, that a demand was created for private cars suitable for the use of excursion parties. This service is highly valuable to the companies, as it gives a large number of passengers at hours when the service would otherwise be light.

The engraving shows a style of parlor car which has proved very popular upon American tramways, and which has been extensively used. As will be seen from the engraving, the car is long, handsomely decorated outside, and has roomy platforms.

Briefly stated, the specifications are: length over all, 36 feet; length of body inside, 25 feet; breadth, 8 feet. The car is mounted upon a pair of "Eureka" Maximum-Traction pivotal trucks and is propelled by two motors, one on each truck. The gauge is 4 feet 8½ inches, the standard in this country, but can be varied to suit conditions.

Elaborate grille work is used for the hood supports as well as for the platform rail, a feature which adds greatly to the elegance of the car and to its attractiveness. As the car does not stop to take up passengers, the steps for the single entrance are placed upon the outer right-hand corners of the platforms, which corner, of course, depending upon the direction in which the car runs. The platforms are made very wide and roomy, a desirable feature, as it enables a longitudinal seat to be placed on the side opposite the step, while the remaining space is available for chairs.

The internal finish and arrangements are of the most beautiful character; twenty rattan chairs, with hair cushions covered with plush, take the place of the usual seats. The floor is inlaid in parquetry. The centre is covered with a large rug. The windows, of French polished plate glass, are of unusually large size; they are fitted with spring roller curtains. In addition, they are each draped with two velour curtains, lined with satin and bound with silk cord. The front edges of the curtains are finished with gold braids.

Each corner of the car is fitted with a buffet, the doors of which have leaded cathedral glass in the panels. In the closet beneath one of them is fitted an electric heater for warming coffee, tea, etc. On each side of the car there are tables fitted for picnic purposes. When not in use these tables pack within the walls of the car, behind hinged panels.

The inside decoration of the roof is usually made very elaborate. The woodwork is all "filled" till a perfectly smooth surface is obtained. It is then rubbed to an "eggshell" gloss. This method of finishing brings out the beauty of the natural grain of the wood, while at the same time a very durable and satisfactory surface is produced.

The hardware and trimmings of the whole car are of solid bronze, highly polished and lacquered. Carved mouldings and head-pieces are introduced, and the whole interior is made as rich as is consistent with good taste.

The elegance and comfort of these cars attract patronage, and their introduction has largely contributed to keep up the popularity of the trolley party. The sizes of these cars can be varied to suit purchasers and the style of decoration made to correspond. It has been found as a general rule that the more elegant the cars, the more popular the service.

Weight of car and trucks, 19,100 pounds.



A New Form of Convertible Car

Convertible Cars Are No Novelty.—The first one probably dates back to the time of the first open car. Indeed, the curtains are endeavors to combine the advantages of both open and closed cars in one vehicle. The great trouble with the cars of this class is that they don't "convert." In some cases they call for a giant's strength to operate the convertible mechanism. In other cases, after the conversion, the car is gloomy, and in not a few instances it is not weather-proof.

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Many convertible cars have been built where there have been no side entrances. The objection to this type is that there is but one entrance. Such cars are slow in unloading, and there is a corresponding loss of mileage. This type of car can only be changed at the car-barn, and at a considerable expense of time and labor. Space for storage of panels and sash is necessary, and there is always a considerable loss by breakage in the handling.

The faults of the convertible, or summer and winter cars, have been so conspicuous, that after a few months of use they have disappeared from service, or, at least, the convertible portion has been put aside completely.

There has been a constantly increasing demand for a car which should satisfactorily meet the demands of both summer and winter service.

A New Design.—With the experiences of twenty-five years in mind, our Mr. John A. Brill took up the problem some months ago, and we think he has worked it out in a most satisfactory and practical manner. He has produced a car in which the objections noted above have been removed. The interior finish is, to the eye, the same as that of an ordinary

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street car, while the exterior differs but slightly from the standard open car. A glance at the engraving, which was made from a photograph of a sample car built for the Brooklyn Heights Railway, will show that the points of difference are not easily detected.

The casual observer sees an open car with a centre aisle. He might notice that the posts come down outside of the round corner seat end panels, and perhaps might observe that the curve of the roof was a little more convex than usual. In other respects there would be nothing different from the ordinary open car. From the inside he would see that the monitor or raised deck was somewhat narrower than the fashion, and that the curve of the roof was slightly more convex and apparently set at a slightly steeper angle. But even these points might escape observation, so nearly is the car like those in common use.

The Distinctive Features.—The posts, however, carry a complete set of panels, sash and glass, as well as roller curtains. Space is found for all these in the roof, completely out of the way and out of sight. Held in place by the ordinary sash-lock is first a panel which, when in place, fills the opening at the end of the seat. This panel is elastic. It may be either metal or fibre, and is in any case backed by horizontal slats. These panels are also lined with wilton carpet, so that the side of the car, with its air space, becomes warmer than that

of a car with the usual form of solid side. This construction enables it to conform to the curves of the grooves, which vary in their sweep according to the sweep of the posts. The latter, it should be understood have the same form as the outside line of an ordinary open car.

When the panels have been let down the lock for the sash is exposed, and the sash is brought down in place. It is made in two parts, hinged together. Apparently they slide in the same groove as the panels; they do not, however. By putting one groove at the bottom of the other, what is equivalent to a double track is secured over one line. The sash, by means of trunnions, slide in the bottom groove. When they reach the top of the posts, where a complicated switch would otherwise be necessary, the sash is turned off to its own line without the intervention of any apparatus, while the panel is carried off in another direction, quite clear from, and in front of, the sash.

The advantage of this construction is very great and reduces to perfect simplicity of operation and mechanism what has heretofore been a great trouble to inventors. Incidentally a gain of two inches in the inside width of the car has been made without increasing the outside width in the least.

In designing this car, among the important matters considered was that of the external appearance. It has been our aim to produce a car which shall be as much as possible like our well-known convertible car, with low sides. This car has both convex and concave panels. For winter service it had double

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sash, making it light and pleasant. In many respects it was a satisfactory and desirable car, and we wished, as far as possible, to make the new car conform to the external appearance of the old. To accomplish this we have made the standard of the sash the same as in our old convertible car, consequently the height of the side is the same.

Operation.—The handling of the sash and panels is precisely the same as that of raising or lowering the sash of an ordinary car window. The solid yet flexible panel comes down and makes a solid side below the seat, the top of which is just level with the elbow or just the height of the window rail of the old convertible car. This is the first time that a solid panel has been made to slide in a groove with double or reverse curves. It comes down and passes the curves with great ease.

After bringing down the panel the sash is lowered in the usual way, and the curtains can be operated in the usual manner, and come down to the sills of the car. The curtains are upon rollers placed inside the other fixtures. When the sash and panels are up these curtains come all the way down to



the floor, completely closing the opening between the seats. There is an inner and entirely independent groove in the posts in which the curtains operate. Both open and closed, the car has all the facility of operation that could be desired in a car of either class.

Advantages.—When closed, that is, when the panels are down, the car is in every respect the same as any cross-seat closed car. It has a proper aisle and platforms for entrance, and windows that can be raised at pleasure. The insides of the

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sliding panels are lined with carpet or other material, so that the side is warmer and as weather-proof as that of an ordinary car. The curtains are then just as easily handled if needed to keep out the sun.

When open, the car has all the advantages of an open car of the usual type. It can be entered from the sides, thus securing quick loading or unloading. The aisle in the centre gives standing room, in which the ordinary open car is so very deficient.

As the change from one style to the other can be quickly made, and as the materials for the transformation are carried in the car itself, it is always possible to command that type of car suitable to the weather. In case of sudden storm or rain or a sudden change of temperature, the car can be made to suit the conditions without delay or expense and without sacrificing the comfort of the passengers.

In cities where Board of Health regulations call for a certain proportion of closed cars at all seasons of the year, these cars can be made to meet the regulations without difficulty. Any car on the line which happens to be scheduled for closed, can be made so by the conductor and motorman within three or four minutes' time. The annoyance and expense caused by the health regulations can in this way be entirely avoided.

Dimensions.—Cars of this type can be built of any size and capacity that may be desired, and can be mounted upon one or two trucks, according to length, weight, etc.

The sample car shown in the engraving has the following general dimensions :

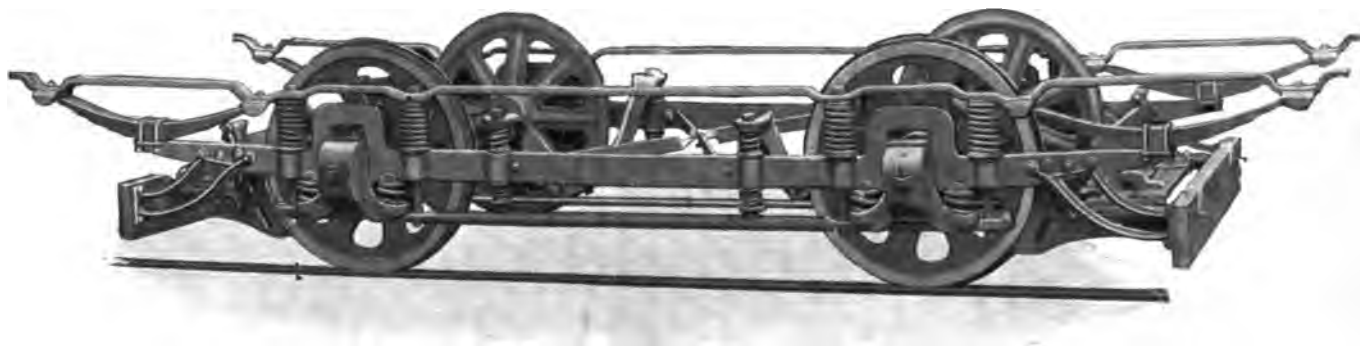
Length of body, 25 feet 9 inches ; width at sills, 7 feet 1 inch ; width at belt rail, 7 feet 9 inches ; length of platforms, one at each end of the car, 3 feet 11½ inches ; length over all, 35 feet 4 inches ; weight without motors, 18,300 pounds. Each end of the car is fitted with the Brill angle iron buffer. The platforms are arranged with steps as usual, but the opening on the left is fitted with a high-hinged gate and is not used for an entrance. A folding gate is placed on the opposite side.

There are eighteen cross seats, 34 inches long, with reversible backs. Backs and seats are covered with spring cane. There is a centre aisle as well as the side entrances at each seat. Round corner seat end panels are used, which add much to the ease and safety of entrance from the aisles. At the ends of the car there are the usual stationary seats. The total seating capacity thus obtained is forty.

There is a running board or step the whole length of the car on each side. This is at the usual height, 18 inches, and folds up like the step of an open car. At the platform there are the usual platform steps with 13-inch risers. These are 13¾ inches from the head of the rail, and being low, give women and children easy access to the car.

In cases where the width of the body is restricted for any reason the car can be built with a single seat on one side of the aisle and a double seat on the other. In this way any condition can be easily met without difficulty.

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FOUR-WHEEL TRUCK.
Brill No. 21-E Non-Pivotal Truck.

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Four-Wheel Trucks for Electric Tram Cars

We took up the subject of trucks for street railway service when electric motors were introduced. The question of composite as against solid frames was the first which presented itself. To decide this and other questions, we built and tested upwards of twenty different types of trucks, which were put in service on various roads, and their performances noted with greatest care for a series of years. We have, as the result of this experience, reverted to the American locomotive practice in the matter of frames, and we now use a solid forged bar.

The engraving shows our No. 21-E truck, the most suitable for four-wheeled motor cars. It embodies the experience gained in the many styles with which we have experimented.

The frame consists of two solid forged side pieces, in which are formed jaws for carrying the journal boxes. There are extension pieces from these jaws, which carry the brakes, fenders and form seats for the semi-elliptic springs, which are placed upon the four corners of the truck. These side frames, called "axle-box frames," are firmly connected by cross bars at the extreme ends and by double bars at their centres. This solid frame insures the "squareness" of the boxes and perfect alignment of the machinery.

Carried upon the top of the springs are the two bars upon which the body rests, called the "upper chords." These bars

are recessed for bolt heads, etc., and give a smooth support to the car body. The main frame is carried upon eight springs, sitting on ears cast upon the bottoms of the journal boxes—a system which gives a spring support to all the weight carried, reduces the height to a minimum and prevents the injurious pounding of rail joints.

It will be seen by examination of the engraving that there is no rigid connection between the car body and the frame. This is an adaptation of the American side motion to four-wheeled cars. The spring posts which pass through the centres of the spirals are allowed ample play in the frame; they govern the motion of the body which floats upon the springs. The advantage of this construction is very observable upon the entrance to curves. The bottoms of the spring posts are connected with tie bars, and from these can be placed braces to support the ends of long cars. (See page 6.)

In the cut, the brakes are shown hung from links. When desired, sliding brake-beams can be furnished.

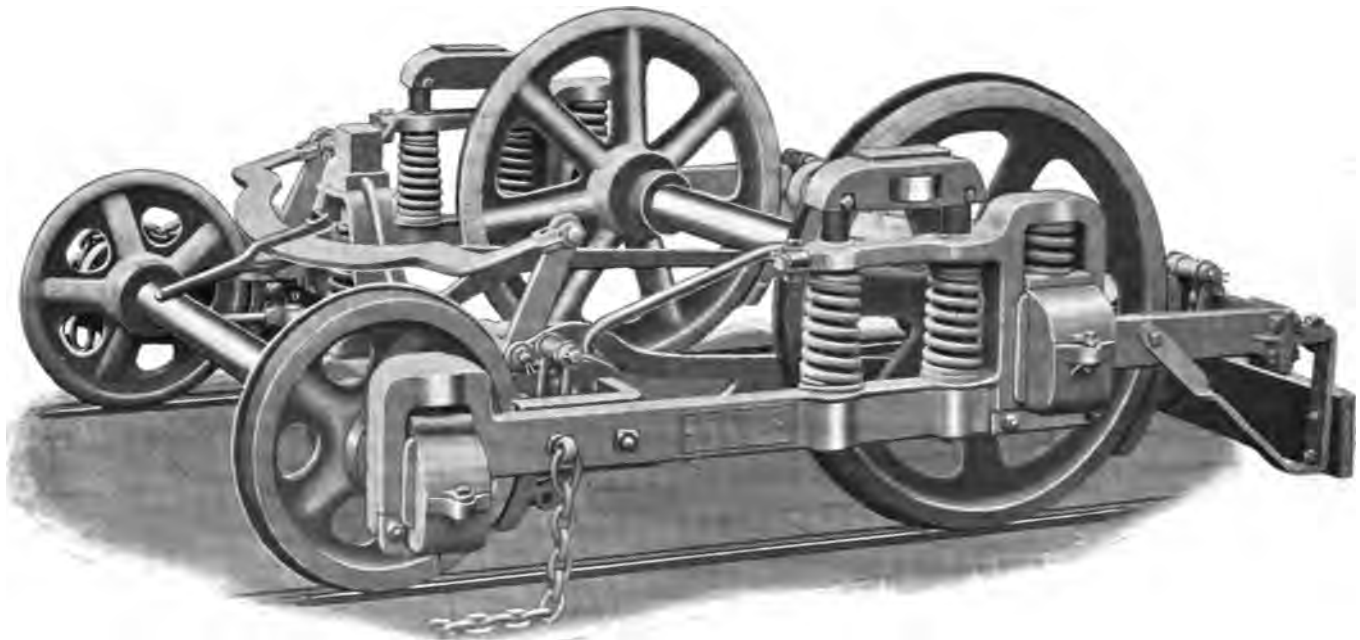
Journal boxes are dust-tight and oil-tight, and will run at least six months without re-oiling.

The long spring base, together with the different types of springs, does away with longitudinal oscillation.

Wheel base, 6 feet to 7 feet 6 inches; spring base, 8 feet 6 inches greater than wheel base; upper chord, 9 feet 7 inches longer than the wheel base; height from track to upper chord (under side of car), 25 inches, with 30-inch wheels.

Weight, about 4,300 to 5,200 pounds.

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"EUREKA" MAXIMUM-TRACTION TRUCK.
Brake Power Graduated in Proportion to the Weight each of the Wheels. Skidding next to Impossible.

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"Eureka" Maximum-Traction Truck

When it is desired to increase the capacity of the electrical railway units, the car body soon reaches a length and weight too great to be carried upon a four-wheel truck with safety to the track and ease to the passengers. Double-truck cars are necessary for large loads and the heaviest service. Many important advantages are gained by the use of double (pivotal) trucks. The greatly increased wheel-base of the car and the absence of overhanging ends puts a stop to all rocking or pitching. The load being divided among a larger number of wheels makes the weight upon each much smaller; even though the total carried has been increased, the result is to make the car much easier on the track. Many engineers think that the four-wheel car will eventually be abandoned for all suburban service and for the heavier traffic in cities.

The Maximum-Traction Truck, shown in the engraving, was designed to bring the car body down till it is as low as that of a four-wheel car, and at the same time to obtain, with but two motors, the same, or nearly the same, tractive effect in proportion to the load as a four-wheel car. These trucks are pivotal, but the load is placed eccentrically upon the truck, so that nearly the whole of it comes on the pair of wheels which are used as drivers. Only sufficient weight is allowed upon the others to secure proper guidance. The radial point about which the truck pivots is in an imaginary vertical line located about 6 inches inside the driving axle. The resulting swing of the driving wheels is very small, and they can be made of large diameter without elevating the car body, as they can be

allowed to come up between the floor timbers. The guiding or "pony" wheels are made of small size, so that they swing clear of the sills and steps. In ordinary practice the drivers have about 80 per cent. of the load, the remaining 20 per cent. being utilized for guiding upon tangents. On curves an automatic adjusting device throws a much larger weight upon the pony wheels, to enable them to guide properly in passing a curve. The removal of a portion of the weight here is of no account, because the current is, or should be, shut off on curves in order to avoid skidding, and little or no motive power is used or needed. When the tangent is reached the load automatically returns to the driving wheels. This amount of load automatically transferred is easily and quickly adjusted to suit the conditions.

The advantages attained with the Maximum-Traction Truck are: the highest tractive power possible on pivotal trucks with two motors to a car; a car body carried as low as with ordinary four-wheel trucks; very steady and easy riding; large diameter of driving wheels; a long, flexible wheel base for the car, with a short one for the trucks (4 feet); giving ability to pass the shortest curves with ease, and a great economy of power, as no more is required than for a four-wheel car carrying the same weight. These important advantages are causing the Maximum-Traction Truck to be adopted wherever long cars are necessary for street or suburban work where frequent stops have to be made.

Another important advantage is that these trucks can be used on open cars without the necessity for two steps, as is the case if an ordinary pivotal truck is employed. Weight, about 3,300 pounds.

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THE "PERFECT" PASSENGER TRUCK.

Brill No. 27.

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71 Victoria St., London, England

The "Perfect" Passenger Truck—Brill No. 27

It is necessary to know something of the theory of the American pivotal equalized swing motion truck in order to understand the remarkable ease with which these trucks carry their loads, the smoothness with which they take curves, their safety on T-rails, even when they have tram rail flanges and treads, their stability under brakes, and their softness on the rails at any speed.

The pivotal truck should be an independent carriage under one end of a car. Its wheels are independent of each other in their vertical motion, while the truck frame itself can rise and fall at the ends, or move bodily sidewise without imparting any of these motions to the car body.

The vertical motions of both wheels and truck frame are all extinguished by springs before reaching the body, which is carried along in a plane parallel to the track, while the truck passes along the rails, conforming to their irregularities, both horizontal and vertical, without communicating its motions to the body.

These complex functions are combined in the "Perfect" or No. 27 Truck. Its practical operation demonstrates this. It has a solid cast-steel frame, with the jaws or horn plates cast

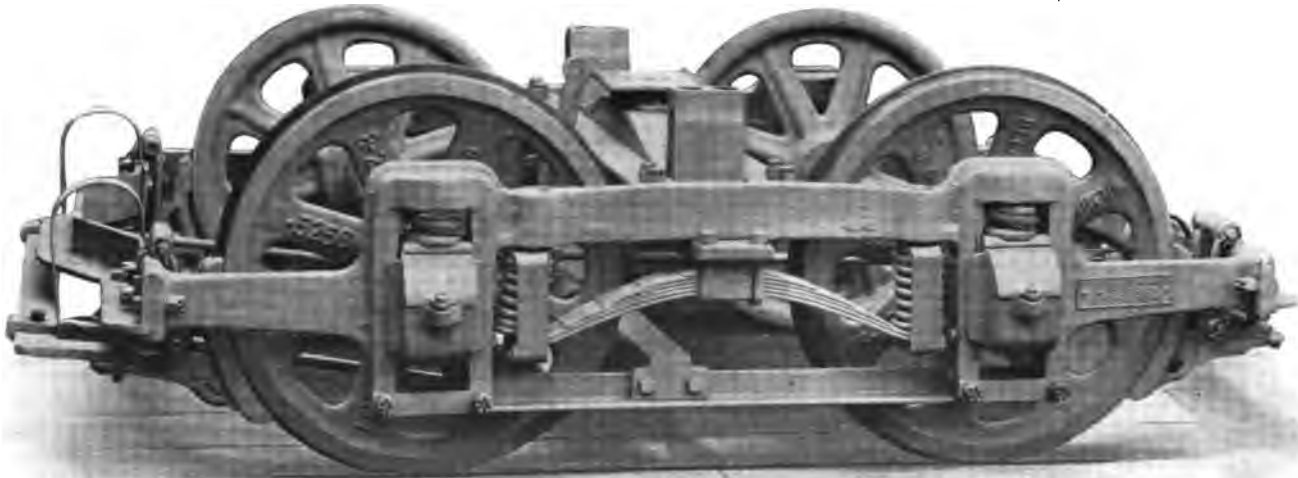
in place. Solid extension pieces, with T-iron ends, complete this truck frame. When so ordered, we make this frame in a single forging. The bolster, with the centre-plate, rests on elliptic springs, which are, in turn, carried by the spring plank, to the ends of which the equalizers are solidly attached. All this portion of the structure is carried upon swinging spring cases or links. There is, therefore, not only a swing motion, but the links are elastic and cushion the motion. The spring-link cases are attached so near the centre of the journals that very little strain is brought by the load on the truck frame. $4\frac{1}{2}$ -inch journal box-springs, nest spirals in the link cases, and double or quadruple elliptic springs, furnish the vertical elasticity.

This truck is especially adapted to suburban and interurban lines, where height of the car body is not important, and where, on account of tram rails, wheels with narrow treads and shallow flanges have to be used, but where it is desirable to run at high speed in the country over T-rails. The truck "sticks to the rails" with remarkable tenacity at all speeds and under all conditions.

This truck has been extensively used in the United States, and has forced its way into service by its remarkable performance. It is even difficult to make a plain statement of its performance without appearing to strangers to be extravagant.

Weight, from 5,000 to 8,000 pounds.

J G. BRILL COMPANY
Philadelphia, U. S. A , and
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THE "UNIVERSAL" TRUCK. BRILL No. 27-G.

J. G. BRILL COMPANY

Philadelphia, U. S. A., and

71 Victoria St., London, England

The "Universal" Truck Brill No. 27-G

This truck was designed to combine the easy riding qualities of the "Perfect Truck" (No. 27) with some of the most valuable features of the Maximum-Traction Truck.

The weight of the car is, in this truck, taken on the centre plate. The motor is placed outside the axle. This not only greatly increases the traction power, but it enables the wheel base to be reduced to 4 feet. The truck then becomes short enough to use upon narrow cars, whether open or closed, and has ample space to swing on the shortest curves. This is accomplished without adding to the height of the car.

The truck belongs to what is known in America as the equalized swing motion type. The body of the car is so suspended that the truck may quickly move sidewise, as at the entrance to a curve, without communicating a shock to the body. This gives great ease in taking curves, while the equal distribution of the weight upon the wheels, even when they are not all resting in the same horizontal plane, makes the truck very "soft" upon the rails. This easy action is very plainly

shown in its freedom from noise in running. The contrast with the hammering of a 4-wheel car is very great.

The "27-G" Truck differs from the Maximum-Traction in drawing from the centre by a bolster, but, like it, has a considerable excess of weight on the driving axle due to the weight of the motor acting as leverage to increase the downward thrust or weight on driving axle. The wheels, however, are all of the same size. The points of support are so distributed, relative to the weight carried by the truck frame, that there is no kicking up under the action of the brakes. This has been a great objection to the use of other pivotal swing motion trucks. The most violent brake action does not disturb the truck in the least. A graduation of the brake pressure upon the wheels, in proportion to the load carried by each, prevents the idle wheel from skidding and removes the great cause for flat wheels.

Three sets of springs are employed, in series, making an exceedingly easy support for the body. The double truck system, of course, entirely obviates all pitching or galloping, and makes the passage of curves very easy. The power required for driving a car mounted upon double trucks is sensibly the same for the same weights as for a car mounted on four wheels. The economy in wear and tear of permanent way is all in favor of the double-truck car. Weight, about 4,200 pounds.

J. G. BRILL COMPANY
 Philadelphia, U. S. A., and
 71 Victoria St., London, England

Snow Plows and Snow Sweepers

On pages 45 and 46 we illustrate two very useful pieces of apparatus for handling snow. These are snow plows and snow sweepers. They will be found indispensable in all snowy countries.

The sweeper has two brooms, with a scraper to clear the track in front of the trailing broom. Wings are also provided for increasing the width of the track cleared. There are aprons to drop over the brooms and prevent snow from being thrown on to the sidewalks. The sweeper has three motors, two of which are used for propulsion and one for operating the brooms. The snow plow illustrated on page 45 is a shear plow of the heaviest description, intended to be strong enough and sufficiently powerful to successfully attack the heaviest drifts. The shear plow is used on double track roads. For those with single tracks another style, known as the nose plow, is employed. This delivers the snow on both sides of the track, instead of one side only. The shear varies in height from 18 inches to 5 feet, according to the necessities.

Machines of this type are principally used on suburban roads. The usual dimensions are:

The following are standard dimensions of our sweepers:

| | |
|---|------------------|
| Length over end sills | 21 feet |
| Length over buffers | 29 feet 8 inches |
| Width of body | 6 feet 10 inches |
| Height over trolley board | 11 feet 6 inches |
| Height to sills | 42 inches |
| Length of shear board | 3 feet 2 inches |
| Length of wings (½-inch iron) | 2 feet |
| The shear is fitted with a brush. | |
| Weight, without motors | 13,850 pounds |
| Weight, with three motors | 23,200 pounds |

The following are standard dimensions of our plows:

| | |
|---|------------------------------|
| Length over end sills | 16 feet 3 inches |
| Width over sills | 6 feet |
| Height to sill | 23 inches |
| Height over trolley board | 10 feet 1 inch |
| Diameter of wheels | 33 inches |
| Diameter of axles | 3¾ inches |
| Width of adjustable shear boards | 24 inches |
| United widths of boards | 5 feet |
| Length of adjustable shear boards | 10 feet 7 inches |
| Extension wings, width | 18 inches |
| Extension wings, length | { 3 feet 10 inches 4 feet |
| Length of leveler | 9 feet |
| Width of leveler | 12 inches |
| Weight | 13,250 pounds |

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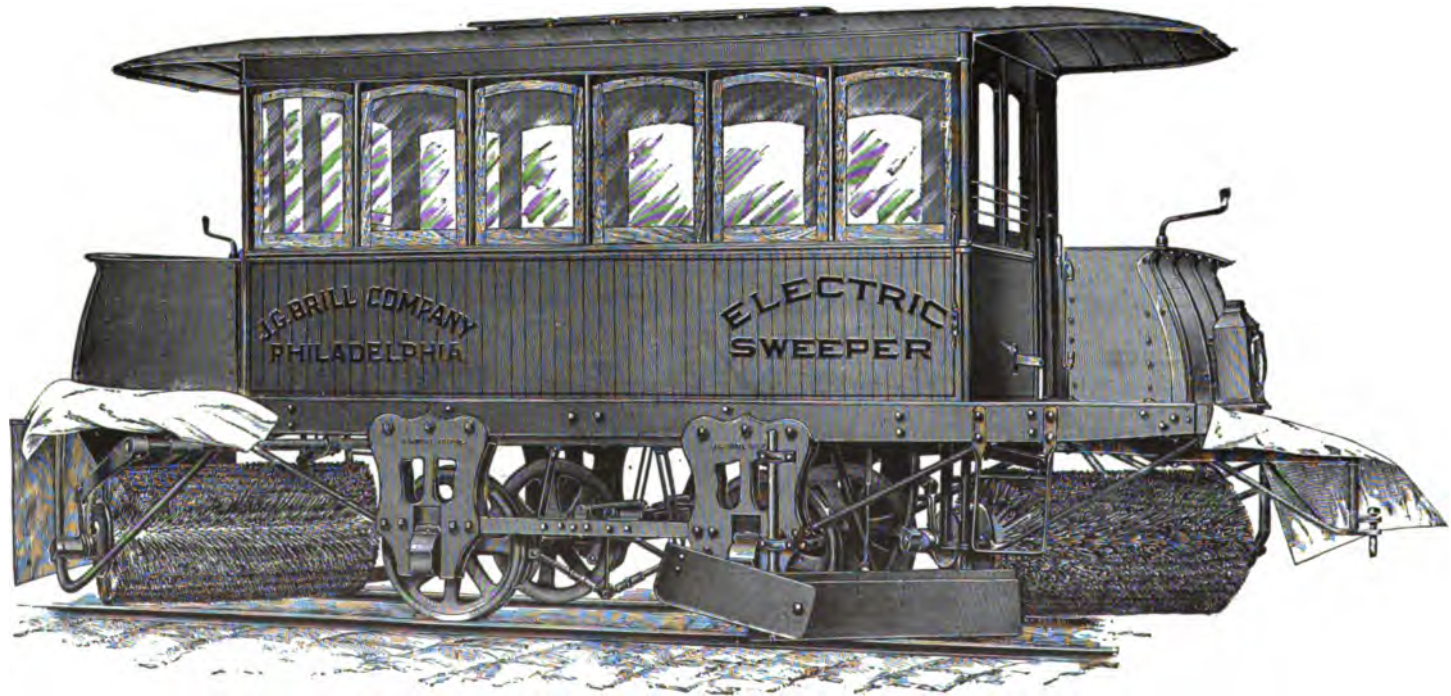
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SNOW PLOW.

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SNOW SWEEPER.
For Description, see page 44.

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The Round Corner Seat End Panel

This is a detail of car construction which has rendered the open car easier of access than formerly, and which enables it to be used with comfort in rain or storm. Owing to the curved form of the posts, the ends of the seats extend over the foot or running board in all open cars. By making the ends of the seats round and fitting our doubly curved panel to them, a great gain in space is obtained at the entrance to the seat. A person may then stand between the seat ends on the step or footboard without danger and without having to lean outward. The passengers enter more safely and more quickly. The cars consequently lose less time in picking up and discharging passengers, and at the end of a trip are more rapidly loaded and unloaded. The curtains extend from letter-board to the floor, completely closing the side of the car. The curved seat ends prevent the curtains from catching or rubbing on the seats, very materially increasing the life of the curtain.

Metal panels are a great addition to the strength of the open car. They also have the advantage of being kept in stock, painted and easily and rapidly replaced in case of accident.



J. G. BRILL COMPANY

Philadelphia, U. S. A., and
71 Victoria St., London, England

Sprinkling Car

Some years since we had the honor of constructing the first sprinkling car ever used upon a street railway. Since that time we have kept abreast with all the improvements of the day, and we are now constructing sprinklers which contain all the necessary and desirable features for doing the work in the most satisfactory manner.

It is beginning to be generally understood that an electric railway cannot be operated to the best advantage without a roadway sprinkler. The high speed of electric cars raises a heavy dust in dry weather on almost any ordinary pavement. On streets that would be considered fairly clean the dust will follow a car going in the same direction as the wind, and make riding an annoyance rather than a pleasure. The advantages of a sprinkler to a railroad company are:

- 1st. Increasing the comfort of the passengers, by doing away with the dust and making a trip on the cars inviting.
- 2d. There is a mechanical advantage, because, with a street thoroughly dampened, there is an avoidance of grit and wearing substances, which do not get into the bearings, and increase the normal wear.
- 3d. There is a decided economy of the electric current due to a better contact between the wheels and rails. This

increase of conducting power is sufficiently marked to make a noticeable difference in the cost of operation.

The 2,500-gallon tank is our standard, but we also build those who desire it a smaller sprinkler carrying a tank of 1,800 gallons capacity. For those who wish a large machine we build one which carries a tank holding 5,000 gallons of water. This is mounted upon a pair of trucks, as the weight is too large for economical operation on four wheels.

All our valves and fittings are made of brass, in order to overcome any difficulty from corrosion.

Those who have sprinkling cars which they have built themselves, or who have cars which they wish to fit up, can be furnished with our sprinkling apparatus complete, ready for attachment.

The tank carries water enough with one filling to sprinkle from $5\frac{1}{2}$ to 8 miles of roadbed; the distance, of course, depends upon the flow of the water and the speed of the vehicle. On country roads or macadam much more water is required than upon brick pavements or asphalt. The steel tank has $\frac{1}{4}$ -inch sides, $\frac{5}{8}$ -inch heads, and is fitted with swash plates to prevent the surging of the water while on the road or while stopping and starting. As a tank material we prefer steel to any other, because it lasts longer, needs no attention in the winter months, is but little heavier than wood, and there are no leaky

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SPRINKLING CAR.

J. G. BRILL COMPANY

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Works of the J. G. Brill Company, at Philadelphia, U. S. A.; cover Eighteen and One-half Acres; have Five Miles of Railway Tracks within the Grounds. The Works are at the junction of Two Trunk Railway Lines.
Capacity, 2,000 Cars and 9,000 Trucks per Year.